

MILLENNIUM APPLICATION

BRIEF

TOPIC: Anion Analysis of **Disk Drive Head Assemblies** by CIA

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Date: 08/02/95

Introduction:

Analysis of low level anionic impurities in high purity water extracts of hard disk drive head assemblies was done using CIA. Analysis of these devices is important in accessing the cleanliness of these heads as well as for failure analysis. Due to the large surface area of the assemblies it was found that one assembly could be easily extracted in 3.0 mL of high purity water and analyzed by CIA. To prevent any sample handling errors or contamination, the devices were extracted in the plastic sample vials used by the CIA. The heads were placed in the vials and extracted by vortexing the assemblies for 10 minutes followed by a 1 hour soak per the customer SOP. The heads were removed, NaOS added, and they were analyzed by CIA. Figure 1 is an electropherogram of a standard. To calculate the amount of contamination present on each head, automatically, custom calculations were used in Millennium as described in MB#44. Figures 2-4 are electropherograms of the water blank, and extracted assemblies. As can be seen various levels of contamination on the assemblies was found.

Calibration

Injections of 4 different levels (1-16 ppb)of anion standards was done with correlation coefficients (r2) of 0.99x with x being a value of 4 or better achieved.

EXPERIMENTAL:

System:

Capillary: Injection:

Data:

Anion Analysis

04000E Electrolyte: Modified Chromate/OFM pH=11.2 75um X 60cm Electromigration -5kV, 45 seconds. Run Voltage: -15kV Detection: Indirect UV at 254nm Millennium 2010 Chromatography Manager, Ver. 2.1 with **CIA** Option

FIGURES:

Figure 1: Electropherogram of a low level anion standard

- Figure 2: Electropherogram of Sample Blank
- Figure 3: Electropherogram of Sample A1-Head Assembly
- Figure 4: Electropherogram of Sample 20-Head Assembly



Northern Kentucky Laboratory

Sample Information

Project Name:	Electronics_Low02		
SampleName:	ppb Anion Std1	•	
Vial:	3	Sample Type:	Electromigr Standard
Injection:	1	Volume:	0.00
Channel:	SATIN	Run Time:	5.0 min
Date Acquired:	07/18/95 04:36:47 PM	Date Processed:	07/18/95 05:36:38 PM
Scale Factor:	1.00	Dilution:	1.00000
Acq Meth Set: Processing Method:	ppb_Anions_6pos ppb_Anions01b		



#	Name	Migration Time (min)	Area (uV*sec)	Time Corr. Area	Height (uV)	Amount (ppb)
1	Cl	3.382	313	92.59	326	2.000
2	SO4	3.552	355	99.87	499	2.000
3	NO3	3.619	198	54.63	209	2.000
4	Oxalate	3.692	226	61.19	310	2.000
5	HCO3	3.917	32940	8410.26	9441	<u></u>
6	F	4.216	358	84.85	309	1.000
7	Formate	4.267	123	28.86	100	·····
8	HPO4	4.310	247	57.33	259	2.000





	Fear Results						
#	Name	Migration Time (min)	Area (uV*sec)	Time Corr. Area	Height (uV)	Amount (ppb)	
1	Cl	3.394	279	82.17	220	1.642	
2	SO4	3.565	179	50.18	227	0.653	
3	NO3	3.635	80	21.88	78	0.851	
4	HCO3	3.927	48138	12259.27	11548		





#	Name	Migration Time (min)	Area (uV*sec)	Time Corr. Area	Height (uV)	Amount (ppb)
1	Cl	3.377	1419	420.33	1181	8.394
2	SO4	3.548	670	188.95	804	4.253
3	NO3	3.617	214	59.25	212	2.227
4	Oxalate	3.689	325	87.99	405	2.939
5	HCO3	3.895	58489	15016.34	12904	
6	Formate	4.261	280	65.79	200	1.737

#	Corrected Amount (ppb)	Amount per piece (ng/part)
1	6.7944	20.383
2	3.6530	10.959
3	1.4266	4.280
4	2.9386	8.816
5		
6	1.7367	5.210

Peak Results



5.00		3.50 4.00 Minutes				
			Peak	Results		
ŧ Nar	ne	Migration Time (min)	Area (uV*sec)	Time Corr. Area	Height (uV)	Amount (ppb)
. Cl		3.376	4921	1457.63	3849	29.107
2 SO4	_	3.547	1684	474.87	2041	11.671
NO3		3.608	1026	284.34	985	10.513
Oxal	ate	3.684	339	91.93	437	3.067
HCO3		3.892	56965	14634.58	12775	
5 F		4.202	1663	395.83	1098	4.975
Form	ate	4.256	413	96.93	256	2.559
HPO4		4.303	316	73.44	247	3,205

Peak Results

-0.004-

#	Corrected Amount (ppb)	Amount per piece (ng/part)
1	27.5066	82.520
2	11.0707	33.212
3	9.7128	29.138
4	3.0672	9.202
5		
	4.9745	14.924
	2.5588	7.677
8	3.2050	9.615

3.205